

Depending upon decisions in the ROD and pursuant to appropriate NEPA review(s), DOE would continue R&D and engage in further testing and demonstrations of Pu disposition technologies which may include: dissolution of small quantities of Pu in both glass and ceramic formulation; experiments with immobilization equipment and systems; fabrication of MOX fuel pellets for demonstrations of reactor irradiation at INEL; mechanical milling and mixing of Pu and feed forms; and testing of shipping and storage containers for certification, in addition to the testing and demonstrations previously described for the can-in-canister immobilization variant and the ARIES. These tests and demonstrations would slightly reduce the quantity of RFETS pit and non-pit materials to be stored at Pantex and SRS, respectively.

The storage and disposition actions proposed for various DOE sites by the Preferred Alternative are summarized in Table 1.6-1.

Table 1.6-1. Storage and Disposition Actions Proposed by the Preferred Alternative

Action	Hanford	NTS	INEL	Pantex	ORR	SRS	RFETS	LANL
Storage								
No Action	X ^a	X ^b	X ^a					X ^a
Upgrade				X ^c	X ^d	X ^e		
Phaseout							X	
Disposition^f								
Pit Disassembly/Conversion	X		X	X		X		
MOX Fuel Fabrication	X		X	X		X		
Pu Conversion	X					X		
Immobilization	X					X		

^a Pending subsequent tiered NEPA decisions for disposition of surplus Pu.

^b NTS does not currently store either Pu or HEU.

^c For storage of those pits currently at Pantex and pits from RFETS.

^d For storage of HEU only.

^e For storage of only those Pu materials currently at SRS and non-pit Pu materials from RFETS.

^f "X" denotes potential sites for locating the disposition facilities pending subsequent tiered NEPA decisions. Only one of each facility is needed for accomplishing the disposition mission.

1.7 SCOPE OF THE PROGRAMMATIC ENVIRONMENTAL IMPACT STATEMENT

Public Scoping Process. During 1994, DOE conducted a phased scoping process to solicit comments on long-term storage and disposition of weapons-usable fissile materials. The initial phase of the scoping process consisted of a series of planning meetings attended by technical experts from DOE's National Laboratories, industry, and academia. These planning meetings helped introduce the objectives of the Fissile Materials Disposition Program to the public and to identify DOE and IWG's roles in implementing the President's *Nonproliferation and Export Control Policy*.

On May 4 and 5, 1994, DOE conducted the first public meeting in Washington, DC. Using the 1994 NAS study as a starting point, the public meeting served as a forum to solicit input on the scope of the Notice of Intent (NOI), which was published on June 21, 1994, in the *Federal Register* (59 FR 31985) to inform the public of the preparation of the Storage and Disposition PEIS.

During August, September, and October 1994, 12 workshops were held to solicit public comment on the scope of the program. Figure 1.7-1 shows the locations and dates of these public scoping workshops. Written comments on the scope of the Storage and Disposition PEIS were also requested from the public. The objective of the workshops was four-fold: comply with NEPA requirements; ensure that the PEIS addresses a range of

reasonable alternatives; solicit relevant, focused input from the public; and continue the ongoing public participation efforts of DOE with the goal of reaching all interested parties.

In addition to the 12 workshops, DOE conducted 2 other meetings in November and December 1994 to obtain public input on the NEPA review strategy and reasonable alternatives for disposition of surplus weapons-usable HEU and Pu. The meeting on November 10, 1994, in Oak Ridge, Tennessee, led to DOE's decision to proceed with a separate EIS to evaluate reasonable disposition alternatives for surplus HEU. A meeting on December 13 and 14, 1994, in Herndon, Virginia, provided preliminary feedback on Pu disposition alternatives from the scoping process and public input on additional concerns relative to the alternatives being considered.

Incorporating Input in the Screening Process. As part of the overall scoping process, a screening committee consisting of five DOE technical experts was formed to identify the reasonable alternatives to be evaluated in the Storage and Disposition PEIS. Using a screening evaluation process to compare potential alternatives against a set of screening criteria, the committee considered input from the general public and used technical reports and analyses from the national laboratories and industry to develop the final list of reasonable alternatives. The initial screening process and results were reviewed by the IWG and a senior technical review group of outside experts.

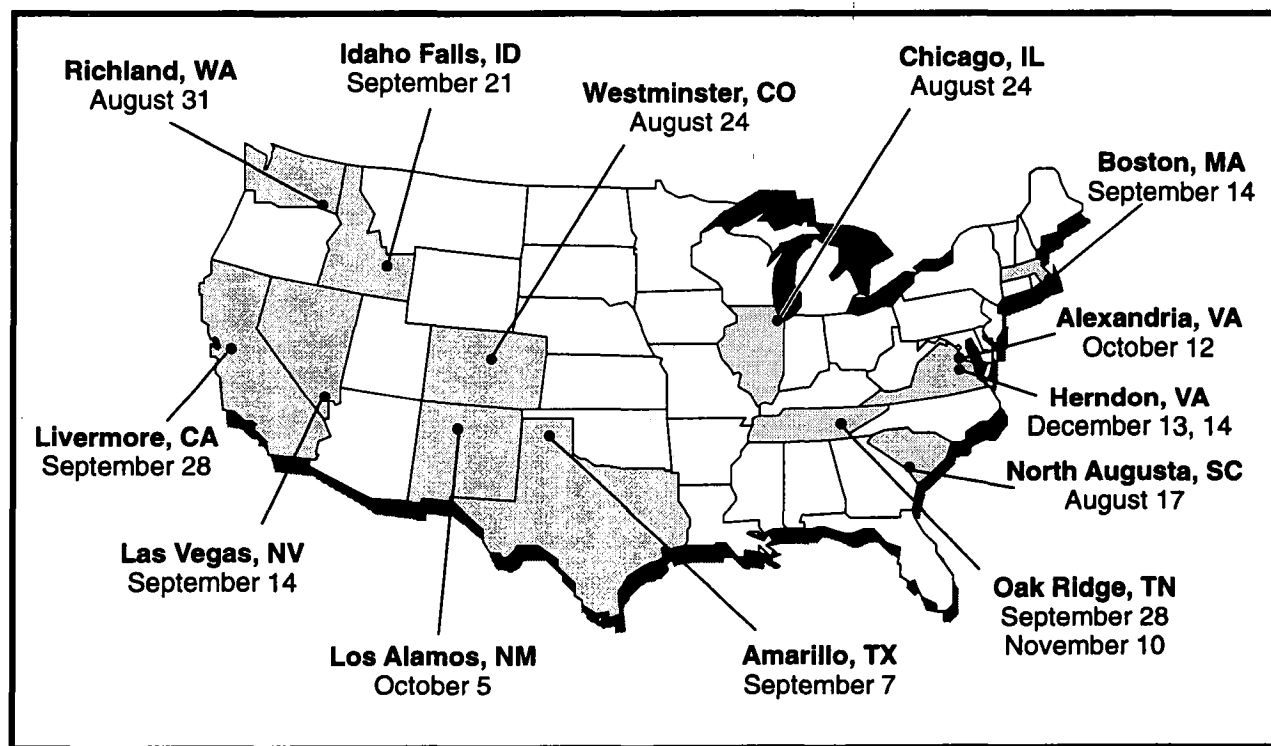


Figure 1.7-1. Public Scoping Workshop Locations, 1994.

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The Department proposed criteria for screening reasonable Storage and Disposition PEIS alternatives and submitted them for public review and comment as part of the formal scoping process for the PEIS. During the scoping workshops, participants were given questionnaires to evaluate DOE's proposed screening criteria. The responses to these questionnaires, together with comments submitted by the public regarding the screening criteria, were reviewed by the screening committee. The input from the questionnaires resulted in several changes and clarifications of the criteria. The final criteria used for selecting alternatives are described in Chapter 2 of this PEIS.

Defining the Significant Issues. In the comment analysis process, written and oral public comments were reviewed and considered on their merits equally, regardless of the manner in which they were submitted. Each public comment was entered into a comment tracking system. A database was created with more than 3,000 individual records documented, and an analysis of similar comments was conducted to identify specific issues that the public felt DOE should address as part of the Storage and Disposition PEIS. The analysis of comments resulted in the identification of approximately 50 issues organized under the following 12 major issue categories:

- Overall scope of the proposed action and alternatives
- Storage alternatives
- Pu disposition
- HEU disposition
- Nonproliferation
- Surplus fissile materials declaration
- Spent Fuel Standard
- Environmental impacts
- Nonenvironmental impacts
- Relationship of the PEIS to other DOE actions
- Screening criteria
- Public participation

The resolution of many comments was described in the *Long-Term Storage and Disposition of Weapons-Usable Fissile Materials Programmatic Environmental Impact Statement Implementation Plan* (DOE/EIS-0229-IP, March 1995) for the Storage and Disposition PEIS. Issues regarding environmental impacts are addressed in this PEIS.

Organizing the Programmatic Environmental Impact Statement to Address Significant Issues. As mentioned in Section 1.3, DOE's proposed action involves evaluation of reasonable alternatives for long-term storage and disposition of weapons-usable Pu and HEU. These alternatives are as follows:

Storage:

- Storage Alternatives
 - Preferred Alternative (Combination)
 - Upgrade at Multiple Sites Alternative
 - Consolidation of Pu Alternative
 - Collocation of Pu and HEU Alternative
 - No Action Alternative
- Candidate Storage Sites

- Hanford
- NTS
- INEL
- Pantex
- ORR
- SRS

Environmental impacts of each long-term storage alternative and the No Action Alternative are analyzed for each of the six candidate storage sites to allow (1) the comparison of impacts by site for each alternative and (2) the comparison of impacts by alternative for each site. As a result, decisions can be made to select a single storage alternative for all sites or a combination of different alternatives for different sites.

Disposition:

- Preferred Alternative (Combination)
- Deep Borehole Category
 - Direct Disposition Alternative
 - Immobilized Disposition Alternative
- Immobilization Category
 - Vitrification Alternative
 - Ceramic Immobilization Alternative
 - Electrometallurgical Treatment Alternative
- Reactor Category
 - Existing LWR Alternative
 - Partially Completed LWR Alternative
 - Evolutionary LWR Alternative
 - CANDU Reactor Alternative
- No Disposition Action

Facilities under each alternative within the Immobilization and Deep Borehole Categories could be designed such that they could process all the surplus Pu over their operating lives. Each disposition alternative under the Reactor Category would consist of reactors that would use the MOX fuel produced from surplus; however, existing surplus Pu comes in various forms, and some of these forms may not be suitable for conversion to MOX fuel without specialized chemical processing.

[Text deleted.] In addition to the proposed storage and disposition alternatives, a No Action Alternative is analyzed. This alternative has two parts: (1) no change in current storage of Pu and HEU and (2) no disposition of surplus Pu. DOE may choose part one, part two, or both parts of this alternative. If only part one were chosen, no change in long-term storage would take place. Therefore, the current DOE storage sites would be used for continued storage of HEU and nonsurplus Pu (the No Action Alternative for these materials), while decisions

would be made for surplus Pu disposition. If only part two were chosen, disposition of surplus Pu would not occur, and this material would remain in storage. Therefore, decisions on long-term storage would become the "No Disposition Action" for surplus Pu. If both parts were chosen, no Pu disposition and no change in current storage of Pu and HEU would occur. This case is analyzed in the Storage and Disposition PEIS as the baseline case for the No Action Alternative. Disposition of surplus HEU is addressed in the HEU EIS.

Each of these alternatives, along with the screening process that led to the selection of these alternatives, is described in detail in Chapter 2. Definitions of the environmental resources and issue areas, and descriptions of the affected environments at each site, are presented in Chapter 3. The general approach and specific methods for assessing environmental consequences, along with estimated results and potential cumulative impacts, are presented in Chapter 4. The information and environmental analyses provided in this PEIS, together with separate cost, schedule, technical, and policy analyses, are intended to address all significant issues raised during the scoping process.

Changes in Scope. The original NOI to prepare the Storage and Disposition PEIS included the disposition of surplus HEU, long-term storage and disposition of surplus U-233, and long-term storage and disposition of minor actinides.

In the course of the public scoping process, it was deemed more appropriate to analyze the impact of surplus HEU disposition in a separate EIS. The decision to analyze HEU separately from the Storage and Disposition PEIS was made for a number of reasons, including the following:

- The disposition of surplus HEU could use existing technologies and facilities in the United States, in contrast to the disposition of surplus Pu.
- The disposition of surplus HEU would involve different alternatives, timeframes, technologies, facilities, and personnel than those required for the disposition of surplus Pu.
- Decisions on surplus HEU disposition are independently justified; would not affect, trigger, or preclude other decisions that may be made regarding the disposition of surplus Pu; and would not depend on actions taken or decisions made pursuant to the Storage and Disposition PEIS.
- Disposition is the most rapid path for neutralizing the proliferation threat of surplus HEU, is consistent with the President's *Nonproliferation and Export Control Policy*, would demonstrate U.S. nonproliferation commitment to other nations, and is consistent with the course of action now underway in Russia to reduce Russian HEU stockpiles.

Accordingly, DOE concluded that surplus HEU disposition should be treated separately, and published a notice in the *Federal Register* (60 FR 17344) in April 1995 to inform the public of its conclusion. The HEU Draft EIS was issued for public review in October 1995 (60 FR 54867), the HEU Final EIS was issued in June 1996 (61 FR 33719), and the resulting ROD was published on August 5, 1996 (61 FR 40619).

The long-term storage and disposition of surplus U-233 were also included in the original scope of the Storage and Disposition PEIS. Existing surplus U-233 is stored at two DOE sites in small quantities. Results of preliminary studies indicate that the only reasonable alternative for U-233 is to blend it down and dispose of it as waste. However, in contrast to Pu and HEU, U-233 is a high-energy radiation source, must be remotely handled, and involves additional worker and public radiation health and safety concerns that would need to be accommodated. In addition, if the U-233 is to be disposed of as waste, the requirements for its waste form must be established for existing or planned waste repositories or disposal sites. Further research on waste form requirements and the feasibility of blending the U-233 to meet these requirements is needed to assess the final disposition of this material. Finally, because U-233 emits high-energy radiation, it is inherently more proliferation-resistant than Pu.

Since U-233 disposition is not ready for decision, DOE is not currently proposing to take action on the disposition of surplus U-233, which will continue to be stored at current locations. Upon identification of disposition requirements and verification of the feasibility of accommodations to meet these requirements, DOE may propose disposition of surplus U-233 and would conduct appropriate environmental analyses under NEPA at that time. Any such disposition of surplus U-233, if proposed, would involve different alternatives, wastes, personnel, worker safety concerns, technologies, and proliferation concerns than disposition of Pu. Any disposition of surplus U-233, if proposed, would be independent of surplus Pu disposition, would be independently justified, would not trigger or affect Pu disposition, and could proceed regardless of any subsequent or prior Pu disposition actions.

The long-term storage and disposition of minor actinides, radioisotopes having atomic numbers of 95 and above, were included in the original scope of the Storage and Disposition PEIS. An assessment of these materials showed that they exist in small quantities, are in active program use, or are planned to be declared wastes. Consequently, there is no need to include minor actinides in the scope of this PEIS.

1.8 SUMMARY OF MAJOR ISSUES IDENTIFIED DURING THE COMMENT PERIOD AND CHANGES TO THE DRAFT PROGRAMMATIC ENVIRONMENTAL IMPACT STATEMENT

1.8.1 ISSUES IDENTIFIED AND RESOLVED

The Department initially issued the Storage and Disposition PEIS as a draft for public comment for the period from March 8 through May 7, 1996 (61 FR 9443). In response to public requests, DOE extended the comment period deadline to June 7, 1996 (61 FR 22038). Public meetings on the Draft PEIS were held in March and April 1996 at the following locations:

Denver, CO	March 26, 1996
Las Vegas, NV	March 28–29, 1996
Oak Ridge, TN	April 2, 1996
Richland, WA	April 11, 1996
Idaho Falls, ID	April 15, 1996
Washington, DC	April 17–18, 1996
Amarillo, TX	April 22–23, 1996
North Augusta, SC	April 30, 1996

During the 92-day public comment period on the Storage and Disposition Draft PEIS, DOE received comments on the document by mail, fax, telephone recording, electronic mail, and orally at the public meetings. Altogether, DOE received approximately 8,700 written and recorded comments from individuals and organizations. All comments are presented in Volume IV of the Storage and Disposition Final PEIS, the *Comment Response Document* (CRD).

Approximately 80 percent of the comments received consisted of mail-in letter and postcard campaigns which expressed either support of or opposition to the use of various sites or alternatives. Many commentators encouraged DOE and the United States to become the world leader in the safe, secure, and timely disposition of

Pu, and favored worldwide nonproliferation efforts for surplus Pu. The following highlights some of the recurring comments, DOE's response, and the PEIS revisions in response to these comments.

A number of commentors expressed the opinion that the surplus Pu should remain in present locations for future energy or weapons use, or until new technologies are available for disposition. In response to these concerns, DOE expanded the discussion on the need for the proposed Pu disposition action in the PEIS. Disposition is necessary to implement the President's *Nonproliferation and Export Control Policy* in a safe, reliable, cost-effective, and timely manner.

Some commentors also stated that DOE should consider additional disposition alternatives, including the use of FFTF, deep burn reactors, and mononitride reactors. The use of advanced reactors such as deep burn reactors and mononitride reactors was considered but eliminated due to the technical immaturity, attendant costs, and lengthy development and demonstration efforts required to bring the technologies to a viable, practical status and enable disposition options to be initiated with certainty. The FFTF would be considered for Pu disposition if first selected for tritium production. The FFTF is not a reasonable, stand alone alternative because it is in a standby status awaiting shutdown and because it could not satisfy the criterion of completing the disposition mission within 25 years. A discussion of FFTF for this purpose is included in Appendix N. In all, 37 different alternative options were considered by DOE for disposition of Pu. DOE has made revisions to the Summary and Chapter 2 of the PEIS to clarify how the screening process was used for selection of reasonable alternatives.

Commentors noted that transportation of fissile materials is one of their major concerns with the Program. The ground transportation between sites, in the event a consolidation alternative was selected, could increase the potential for traffic accidents. International transportation for specific border crossings for the shipment of MOX fuel to Canada for the CANDU Reactor Alternative was also identified as a concern. DOE acknowledges the public's concern, and in response, the transportation analysis in Section 4.4 and Appendix G of the Draft PEIS was expanded. The revisions address security measures for land and sea transport, emergency preparedness, and clarify the results of analyses performed.

One frequently recurring comment presented by the public relates to the technical, cost, schedule, and nonproliferation analyses to support DOE's ROD. Many of the commentors suggested that DOE should make information available for public review. Since issuance of the Draft PEIS, DOE has prepared both the *Technical Summary Report for Long-Term Storage of Weapons-Usable Fissile Materials* (DOE/MD-0004 Rev. 1) and the *Technical Summary Report for Surplus Weapons-Usable Plutonium Disposition* (DOE/MD-0003 Rev. 1). These two reports summarize representative technical, cost, and schedule data for the reasonable alternatives being considered for long-term storage and surplus Pu disposition, respectively. In July and August 1996, these documents were initially distributed for public review and comment. After taking the public's comments into consideration, DOE revised and re-issued both reports in November and December 1996. In October 1996, DOE issued the *Draft Nonproliferation and Arms Control Assessment of Weapons-Usable Fissile Material Storage and Plutonium Disposition Alternatives*, which analyzes the nonproliferation and arms reduction implications of the alternatives addressed in the PEIS for Pu and HEU storage and the disposition of surplus Pu. From October through early November 1996, the public was asked to review and comment on the draft nonproliferation document; this process included a series of 10 public meetings held nationwide. Public comments received are being taken into consideration in revising the report, which is scheduled for re-issue in late 1996. This report, in conjunction with the Final PEIS, the technical summary reports previously described, and public input, will form the basis for DOE's decisions, which will be discussed in a ROD to be issued no sooner than 30 days after publication of the Environmental Protection Agency's Notice of Availability of the Storage and Disposition Final PEIS.

Commentors also stated that the U.S. Nonproliferation Policy does not encourage the civil use of Pu or Pu processing for either nuclear power or nuclear explosive purposes. The commentors requested that the PEIS address the possibility that the MOX option would have an adverse effect on U.S. nonproliferation policy by encouraging its use in civil nuclear power programs and by encouraging Pu reprocessing and recycling. DOE

acknowledges the public concern for nonproliferation. As discussed in the PEIS, the reactor option would utilize a once-through fuel cycle. Spent fuel from disposition would be disposed of with other commercial reactor spent fuel. This is consistent with U.S. policy since no Pu in the spent fuel would be recycled. Revisions to Chapter 1 of the PEIS were made to expand and clarify this issue.

Commentors indicated that the isotopic composition of the residual Pu in the final waste forms is an inappropriate criterion by which to assess proliferation risks because it perpetuates a myth that reactor-grade Pu cannot be used to make workable weapons. In the opinion of these commentors, isotopic degradation does not constitute a compelling argument in favor of the MOX option. DOE acknowledges that, although it may be possible to make a nuclear weapon from spent commercial reactor fuel, this can only be done with extreme difficulty by individuals with a great deal of experience in handling and processing nuclear materials. DOE believes that the disposition of weapons Pu through the use of MOX fuel in reactors would meet the Spent Fuel Standard in creating a radiological barrier that makes the Pu as difficult to retrieve and reuse in weapons as Pu in spent commercial fuel. The use of this technology would allow for the Pu to be disposed in a geologic repository pursuant to the *Nuclear Waste Policy Act*,¹⁶ the same as for spent commercial fuel. Revisions to Chapter 1 of the PEIS were made to clarify this issue.

1.8.2 CHANGES MADE TO THE DRAFT PROGRAMMATIC ENVIRONMENTAL IMPACT STATEMENT

This section identifies changes made since the issuance of the Draft PEIS. The Final PEIS includes the Preferred Alternative, which is a combination of other alternatives and is described in Section 1.6. Other changes, after considering public comments, are described below.

Appendix N, which in the Draft PEIS summarized the operational aspects of the multipurpose reactor, has been revised for the Final PEIS to provide information on the costs and benefits of conducting separate tritium production and Pu disposition missions versus the costs and benefits of carrying out one multipurpose mission. Included in Appendix N is a cost comparison of using new Advanced LWRs or Modular Helium Reactors (MHR), and a discussion of issues regarding the use of the FFTF (a liquid metal reactor at Hanford) for tritium production and Pu disposition.

Appendices O, P, Q, and R were added to the Final PEIS to help clarify alternative issues as they relate to the Preferred Alternative. Appendix O describes two can-in-canister technology concepts at SRS, which are variants of the Vitrification and Ceramic Immobilization Disposition Alternatives described in Chapter 2. This information was added based on public interest in these concepts during the Draft PEIS comment period, and also because of DOE's reconsideration of this technology as being a viable approach for Pu disposition through immobilization.

Appendix P provides a description of using the Manzano Weapons Storage Area (WSA) near Albuquerque, NM to store Pu pits. This appendix was added because DOE's Preferred Alternative separates the storage of pits from non-pit materials, in which case Manzano WSA no longer appears unreasonable under the Preferred Alternative for pit storage. However, since DOE's preferred site for interim storage of pits is Pantex (as described in the Pantex EIS) and since the majority of pits are already located in storage at Pantex, the Preferred Alternative proposes the long-term storage of Pu pits at Pantex. Weapons assembly/disassembly would continue at Pantex in any case. Construction of a new storage facility at Manzano would create needless expense and transportation risk.

Appendix Q describes the operations and human (radiological) health impacts associated with Pu pits being transferred from RFETS to Pantex, repackaged in Zone 12 South, and placed in storage in Zone 4 West at Pantex, as part of the Preferred Alternative for storage. The information presented in this appendix is based on the Pantex EIS analysis of storing the Pu pits already at Pantex.

¹⁶ Also referred in the PEIS as a geologic, permanent, or HLW repository.

Appendix R discusses aircraft crash and radioactive release probabilities for proposed storage and disposition facilities at Pantex.

Section 1.2 of the Final PEIS has been revised to reflect the cooperative effort between the United States and Russia to study different options for managing excess Pu (including secure storage, conversion of Pu weapons components to other forms, and stabilization of unstable forms of Pu), and options for disposition of excess Pu (deep borehole, immobilization, and reactors). The results of this study have been documented in the *Joint United States/Russian Plutonium Disposition Study* report, completed in September 1996. This study and the options considered will provide decisionmakers from both countries with a set of jointly evaluated alternatives for Pu disposition and help build further trust and cooperation in the area of fissile material disposition.

